

Earthquake Shaking Potential for California

Spring, 2003

This map shows the relative intensity of ground shaking and damage in California from anticipated future earthquakes. Although the greatest hazard is in the areas of highest intensity as shown on the map, no region within the state is immune from potential for earthquake damage. Expected damages in California in the next 10 years exceed \$30 billion.

Important messages about earthquakes for Californians to remember:

- ⊙ Earthquakes have produced over \$55 billion in losses in California since 1971. The next large earthquake may produce even greater losses, especially if it affects a major urban area. California's two largest urban centers lie in the State's highest seismic hazard zones.
- ⊙ A large earthquake in or near a major urban center in California will disrupt the economy of the entire State and much of the nation. Effective disaster planning by State and local agencies, and by private businesses, can dramatically reduce losses and speed recovery.
- ⊙ Current building codes substantially reduce the costs of damage from earthquakes, but the codes are intended only to prevent widespread loss of life by keeping the building from collapsing, not to protect the building from damage.
- ⊙ If the Northridge or Loma Prieta earthquakes had occurred closer to a major population center, fatalities would have been much higher. The earthquakes in Japan (over 5,000 deaths), Taiwan (over 2,000 deaths), and Turkey (over 20,000 deaths) produced catastrophic death tolls.
- ⊙ After a large earthquake, residents and businesses may be isolated from basic police, fire, and emergency support for a period ranging from several hours to a few days. Citizens must be prepared to survive safely on their own, and to aid others, until outside help arrives.
- ⊙ Maps of the shaking intensity after the next major earthquake will be available within minutes on the Internet. The maps will guide emergency crews to the most damaged regions and will help the public identify the areas most seriously affected.

Efforts to reduce the losses from earthquakes have already proven effective. California's enhanced building codes; strengthened highway structures; higher standards for school and university, police and fire station construction; and well prepared emergency management and response agencies, reduced deaths, injuries and damage in recent earthquakes. Strengthening of older buildings, gaining a better understanding of California's earthquake threat, and continued education and preparedness will pay an even greater dividend to Californians in speeding response and recovery after future earthquakes.

Three-quarters of Our Nation's Earthquake Losses will be in California



Level of Earthquake Hazard

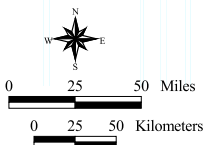
These regions are near major, active faults and will on average experience stronger earthquake shaking more frequently. This intense shaking can damage even strong, modern buildings.



Increasing Intensity

These regions are distant from known, active faults and will experience lower levels of shaking less frequently. In most earthquakes, only weaker, masonry buildings would be damaged. However, very infrequent earthquakes could still cause strong shaking here.

County boundaries
Highways
Water



Data Sources: Seismic Shaking Hazard calculated by the California Geological Survey from the USGS/CGS seismic hazards model (Frankel and others, 2002) considering amplification in near surface soils as shown by Wills and others (2000) using the amplification factors recommended by the Building Seismic Safety Council (1997). Major roads from Thomas Brothers Maps, Inc., 2000, 2001. Shaded relief from U.S. Geological Survey 30 meter DEMs. Building Seismic Safety Council, 1997, 1997 Edition, Recommended Provisions for Seismic Regulations for new buildings and other structures, part 1, provisions, FEMA 302, Building Seismic Safety Council, Washington D.C., 334 p. Frankel, A.D., M.D. Petersen, C.S. Muller, K.M. Haller, R.L. Wheeler, E.V. Leyendecker, R.L. Weston, S.C. Harnes, C.H. Cramer, D.M. Perkins, and K.S. Rukstales, 2002, Documentation for the 2002 Update of the National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 02-420, 33 p. Wills, C.J., M.D. Petersen, W.A. Bryant, M.S. Roelke, G.J. Saucedo, S.S. Tan, G.C. Taylor, and J.A. Treiman, 2000, A site conditions map for California based on geology and shear wave velocity: Bulletin of the Seismological Society of America, v. 90, no. 6b, p. S187-S208.

Additional copies can be ordered through CSSC by calling (916) 263-5506 or the map can be downloaded from <http://www.seismic.ca.gov/cscpub.htm>.

